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(12) (19) (CA) **Demande-Application**

(21) (A1) **2,208,340**
(22) 1997/06/20
(43) 1998/12/20

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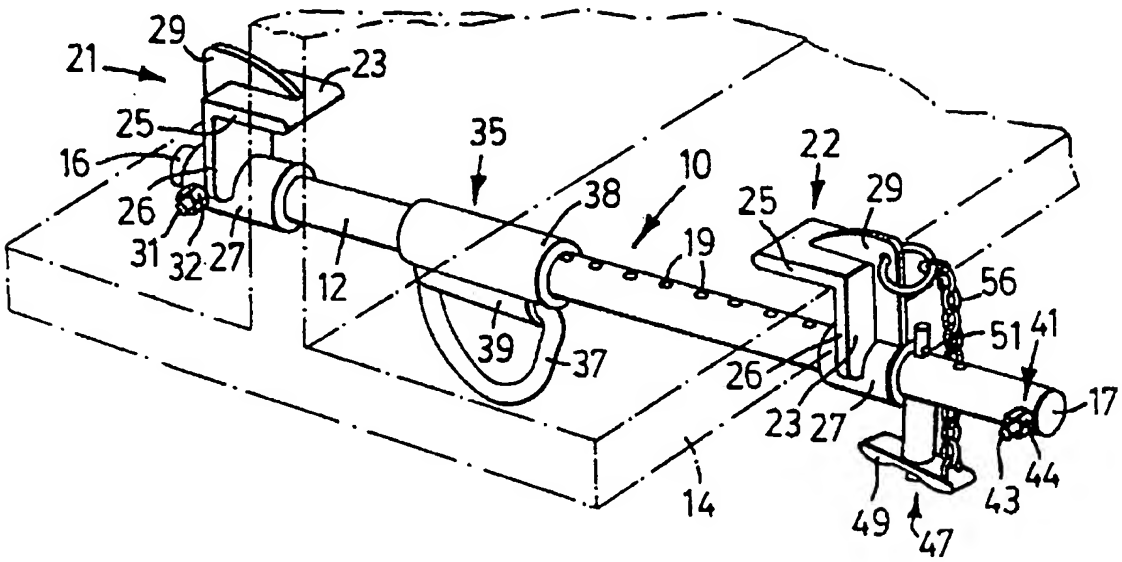
(51) Int.Cl.[6] A62B 35/00

(54) **DISPOSITIF DE SECURITE POUR TRAVAILLEURS DE LA CONSTRUCTION**

(54) **CONSTRUCTION WORKER'S SAFETY DEVICE**



(57) L'invention porte sur un dispositif de sécurité pour fixation coulissante à l'aile d'une poutre en I. Le dispositif est constitué d'une tige en métal ayant une pluralité de trous espacés sur sa longueur, un premier élément de mise en prise sur l'aile fixé à une première extrémité de la tige, et un deuxième élément de mise en prise sur l'aile fixé de façon à coulisser sur la tige. Un moyen de fixation pour un cordon de sécurité est fixé à la tige de façon à pouvoir y coulisser, et des moyens de blocage sont fixés à une deuxième extrémité de la tige pour empêcher le deuxième élément coulissant de mise en prise sur l'aile et le moyen de fixation du cordon de se détacher de la tige. Une cheville de grosseur voulue pour entrer dans chacun des trous espacés sur la longueur de la tige fournit un moyen d'assujettir à l'aile d'une poutre en I les éléments de mise en prise sur l'aile. La cheville comprend un moyen amovible pour la fixer en place.

(57) The invention is a safety device for sliding attachment to a flange of an I-beam. The device is a metal rod having a plurality of holes spaced along it, a first flange engaging member affixed at a first end of the rod, and a second flange engaging member slidably attached to the rod. Attachment means for a safety lanyard is slidably attached to the rod, and stop means are attached at a second end of the rod for preventing the disassembly of the slidable second flange engaging member and the lanyard attachment means from the rod. A pin sized to extend through each of the holes spaced along the rod provides a means for securing the flange engaging members to a flange of an I-beam. The pin has means to releasably secure it in place.

ABSTRACT

The invention is a safety device for sliding attachment to a flange of an I-beam. The device is a metal rod having a plurality of holes spaced along it, a first flange engaging member affixed at a first end of the rod, and a second flange engaging member slidably attached to the rod. Attachment means for a safety lanyard is slidably attached to the rod, and stop means are attached at a second end of the rod for preventing the disassembly of the slidable second flange engaging member and the lanyard attachment means from the rod. A pin sized to extend through each of the holes spaced along the rod provides a means for securing the flange engaging members to a flange of an I-beam. The pin has means to releasably secure it in place.

The invention is a safety device for tethering a construction worker to a flange of an I-beam. The invention provides a slidable engagement with the I-beam so that the worker can easily move along the beam while being secured against a life threatening fall.

BACKGROUND OF THE INVENTION

Currently, the principal fall arrest system used for steelworkers involved in building construction or other structures requiring work on an I-beam framework involves the stringing of a network of static lines to which the worker can be tethered continuously while on the job. In those circumstances where a static line securement is not available, the worker moves along a beam using a cooning cable wrapped around the beam. This latter type of securement requires the worker to straddle the beam and move slowly along it by alternatingly sliding the cooning cable and then himself. The use of static lines is costly in both the time required for their installation and removal as well as for the materials themselves. While the use of static lines provides an acceptable level of security for the worker, the lines cannot be strung adjacent all work sites so that the use of cooning cable securement for construction workers is commonplace. As a safety device, cooning cables present a safety hazard upon their securement about the beam because the worker is required to swing the cable around the beam so that both ends are secured to his person. The swinging of the cable can cause the worker to lose his balance. From a productivity point of view, the use of cooning cables is undesirable as the construction worker can only move very slowly along the beam.

SUMMARY OF THE INVENTION

The present invention addresses the disadvantages of

currently used safety devices by providing a portable device which is attachable to a flange of an I-beam and which is slidable along the beam. A worker tethered to the device of the invention has the same degree of safety as provided by a static line system, but at a fraction of the cost. The invention allows the worker to have complete mobility along all beams comprising the structure, and the device is sufficiently light weight so that the worker can carry a second one for use at junction points, thereby maintaining a tied off condition at all times.

Accordingly, the invention provides a safety device for sliding attachment to a flange of an I-beam, comprising a rod having a plurality of holes spaced along it, a first flange engaging member affixed at a first end of the rod, and a second flange engaging member slidably attached to the rod. Attachment means for a safety lanyard is slidably attached to the rod, and stop means are attached at a second end of the rod for preventing the disassembly of the slidable second flange engaging member and the lanyard attachment means from the rod. A pin sized to extend through each of the holes spaced along the rod provides a means for securing the flange engaging members to a flange of an I-beam. The pin has means to releasably secure it in place.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a safety device of the invention as attached to a flange of an I-beam.

Figure 2 is a side elevation of the device of Fig. 1.

A preferred device 10 according to the invention comprises a metal rod 12 having a sufficient length to

span somewhat beyond the width of a standard structural steel I-beam flange 14. A suitable metal for the rod 12 and other structural components of the device 10 is stainless steel. For most applications, the rod 12 should be 14-18 inches (35.5-45.7 cm) long and should have a diameter of 3/4-7/8 inch (1.91-2.22 cm). For most applications, a 3/4 inch (1.91 cm) by 15 inch (38.1 cm) rod 12 of cold rolled stainless steel is suitable. The rod 12 has a first end 16 and a second end 17, and a plurality of holes 19 are spaced along most of its length from the second end 17. Preferably, the holes 19 are parallel and evenly spaced along the rod 12. It has been found that holes having a diameter of 1/4 inch (0.64 cm) spaced at intervals of 9/16 inch (1.43 cm) is suitable. By providing 12-20 holes 19 along the rod 12 from near the second 17 toward the first end 16, the device 10 may be adjusted to fit flange widths normally encountered in structural steel work.

A first flange engaging member 21 is affixed at the first end 16 of the rod 12, and a second flange engaging member 22 is slidably attached to the rod 12. The flange engaging members 21 and 22 may also be made of steel, preferably stainless steel. Each flange engaging member 21 and 22 comprises a steel plate 23 bent at approximately a right angle defining two legs 25 and 26. The angled plate 23 is attached to a tubular steel sleeve 27, for example, by welding, and the sleeve 27 fits over the rod 12. Preferably, the angle plate 23 is reinforced by a stiffener plate 29 welded to it and the sleeve 27. Suitable steel plate for use in making the angle plate 23 is 3/16 inch (0.48 cm) by 2 inch (5.1 cm) stainless; however, the thickness of the plate can vary in the range 3/16-1/4 inch (0.48-0.64 cm). The width of the flange engaging members 21 and 22 should be sufficient to provide the desired strength, and in this regard, a 2 inch (5.1 cm) width has been found to be reasonable. The

two legs 25 and 26 of each angle plate 23 should be sufficiently long to provide secure engagement with a flange 14 of an I-beam, and also to provide enough play between the flange 14 and the device 10 so that the device 10 can be moved readily along the flange 14. In this regard, the leg 25 having an inside length of about 1.5 inches (3.8 cm), and the leg 26 having an inside length of about 1 inch (2.54 cm) has been found to be suitable for most applications.

The first flange engaging member 21 is affixed at the first end 16 of the rod 12, for example, by means of a bolt 31 and locking nut 32, the bolt 31 passing through the rod 12 and sleeve 27. The second flange engaging member 22 may move freely along the rod 12 to provide the desired degree of adjustability for the device 10 in the manner described below.

An attachment means 35 for a worker's safety lanyard is slidably attached to the rod 12. Thus, a ring 37 is attached to a tubular sleeve 38 by means of an angled ring carrier 39, for example, by welding, and the assembly is applied to the rod 12. Preferably, the attachment means 35 is positioned between the first and second flange engaging members 21 and 22.

The lanyard attachment means 35 and the second flange engaging member 22 are retained on the rod 12 by a stop means 41 attached at the second end 17 of the rod 12. A suitable stop means 41 is a bolt 43 secured through a hole in the rod 12 by means of a locking nut 44.

The device 10 is secured to a flange 14 of an I-beam by adjusting the slidable flange engaging member 22 and retaining it in place by means of a sizing pin 47 placed through a hole 19 immediately adjacent to the outer end

of the flange engaging member 22. The sizing pin 47 has a first finger grip end 49 and is retained in the hole 19 by a suitable releasable means such as spring biased protuberances 51 located near the second end 53. The protuberances 51 may be a pair of small ball bearings extending through opposite ends of a hole provided transversely through the second end 53 of the pin 47, and which are retractable upon releasing the spring bias using a button 54 located at the first end of the pin 47. For convenience, the sizing pin 47 may be attached to the second flange engaging member 22 by a short chain 56.

In use, the device 10 can be attached to an I-beam flange 14 upon which the worker is walking, or it can be attached overhead to an I-beam flange 14 beneath which the worker is walking. Workers who work on structural steel wear a body harness to which is attached a lanyard about 5 feet (1.52 m) long. After securing the device 10 to an overhead or underfoot I-beam flange 14 and ensuring that the sizing pin 47 is secured in the appropriate hole 19 adjacent the outer end of the second flange engaging member 22, the worker clips his lanyard onto the ring 37, thereby tying himself off against a catastrophic fall. The device 10 may be moved along behind the worker by simply tugging on the lanyard. The play in the connection of the device 10 to the flange 14 allows the device 10 to be readily pulled along the flange 14 of the beam. Thus, the invention provides the worker with a degree of safety and security on the job at least commensurate with that presently available using static lines and cooning cables. The device 10 has the advantages of being highly portable, simple to use, and much less expensive than presently available safety systems.

CLAIMS:

1. A safety device for sliding attachment to a flange of an I-beam, comprising:

a rod having a plurality of holes spaced along it;

a first flange engaging member affixed at a first end of the rod;

a second flange engaging member slidably attached to the rod;

attachment means for a safety lanyard, the attachment means being slidably attached to the rod;

stop means attached at a second end of the rod for preventing the disassembly of the slidable second flange engaging member and lanyard attachment means from the rod; and

a sizing pin sized to extend through a hole spaced along the rod, the pin having means to releasably retain it in the hole.

2. A safety device as claimed in claim 1, wherein the rod is stainless steel having a length of 14-18 inches (35.5-45.7 cm) and a diameter of 3/4-7/8 inch (1.91-2.22 cm).

3. A safety device as claimed in claim 1, wherein each hole spaced along the rod has a diameter of about 1/4 inch (0.64 cm).

4. A safety device as claimed in claim 1, wherein each first and second flange engaging member, comprises a stainless steel plate bent at a right angle.

5. A safety device as claimed in claim 4, wherein the steel plate is 1/8-1/4 inch (0.32-0.64 cm) thick.

6. A safety device as claimed in claim 4, wherein the flange engaging members are each about 2 inches (5.1 cm)

wide.

7. A safety device as claimed in claim 1, wherein the attachment means for the lanyard is a ring attached to a tube about the rod.

8. A safety device as claimed in claim 7, wherein the attachment means for the lanyard is positioned between the first and second flange engaging members.

9. A safety device as claimed in claim 1, wherein the stop means at the second end of the rod is a bolt secured by a nut through a hole at the second end.

10. A safety device as claimed in claim 1, wherein the sizing pin has a transverse gripping member at a first end and a spring loaded retaining means at a second end, a push button release for the retaining means is located at the first end.

11. A safety device as claimed in claim 10, wherein the retaining means are a pair of ball bearings extending through opposite ends of a hole extending transversely through the second end of the sizing pin.

12. A safety device as claimed in claim 1, wherein the sizing pin is attached to the second flange engaging member by a chain.

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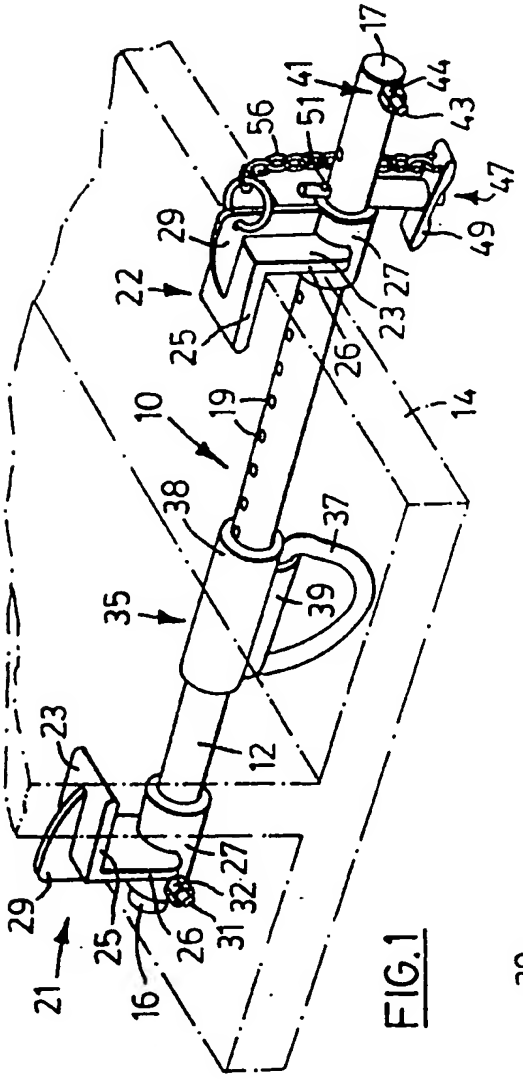
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FIG.1

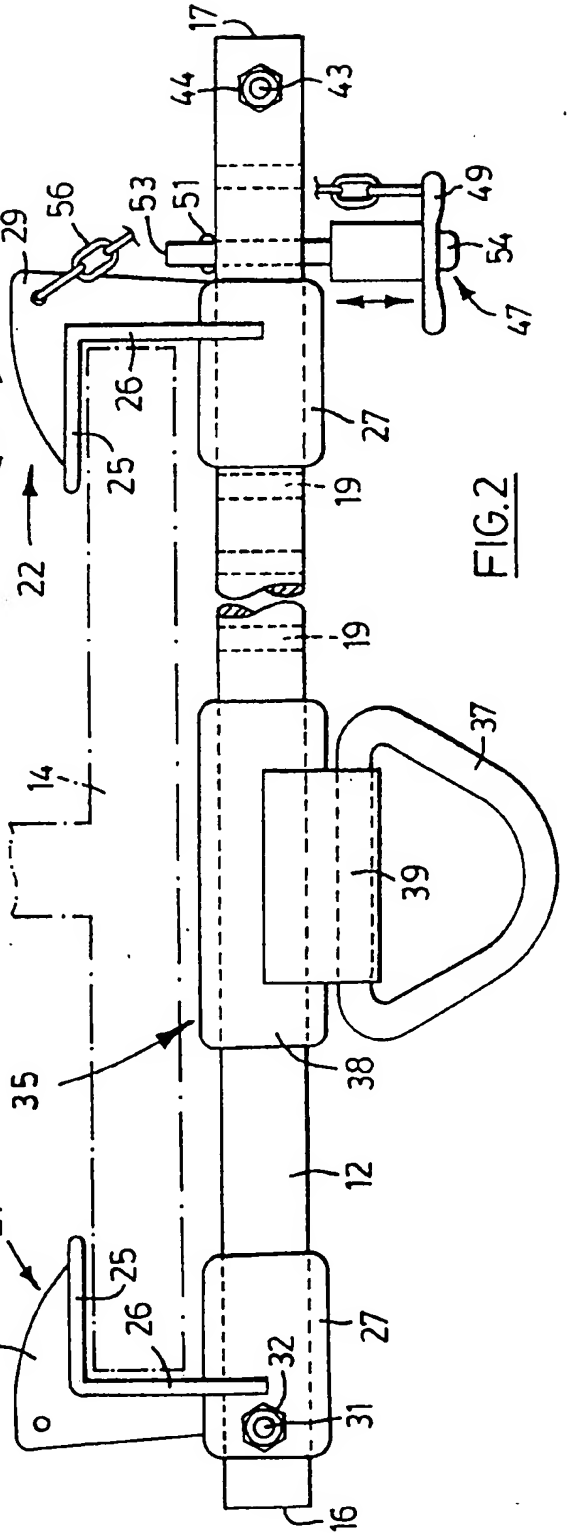
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FIG.2